beyond his reach. Rather more or rather less mathematics would probably suit a larger class of students. A second weakness of the book, and one which robs it of some value as a systematic treatise, lies in the somewhat arbitrary way in which certain branches of geophysics have been neglected, while others have been accorded very full treatment.

In general, however, the ground has been very thoroughly covered. Many valuable references are given throughout, and save for the last few years they seem very fairly complete. In his preface the author refers with regret to several interesting investigations which have appeared too late to be made use of in the text of the book. The reviewer has found few instances of work overlooked. Taking the work of this country alone—work which has in general received a full and generous treatment—the only important omissions that he has noted have been some of the investigations on wave problems of Prof. Lamb and the scientific results of Sir Ernest Shackleton's last Antarctic voyage. But all students reading the book must find many references which will be new to them, and the book has been made more serviceable by a useful index of authors and subjects.

Throughout the whole range of subjects considered—and there are included geodesy (practical and theoretical), seismology, isostasy, and the theories of tides, ocean currents, waves, seiches, rivers and glaciers—the treatment is fresh and full. As a type of the questions discussed in a most interesting manner the winding form of a river-bed may be selected for mention, also the problem of glacial epochs and the differing views as to the nature of the earth's interior. The general answer which Dr. Rudzki gives to the solutions so far offered for most of the problems he discusses is "Not proven," and no fault can be found with him for adopting so cautious a position. The book is replete with suggestions of unsolved problems, and would supply fruitful reading to many a student on the look out for a piece of research off the ordinary lines.

F. STRATTON.

THE EVOLUTION OF MAN.

(1) *Anthropogenie oder Entwickelungsgeschichte des Menschen, Keimes- und Stammesgeschichte.* By Prof. E. Haeckel. Sechste Auflage. Erster Teil, Keimesgeschichte des Menschen. Pp. xxviii+432+xvi plates. Zweiter Teil, Stammesgeschichte des Menschen. Pp. x+(433–992)+(xvii–xxx) plates. (Leipzig: W. Engelmann, 1910.)

(2) *Der Mensch: sein Ursprung und seine Entwicklung.* By Prof. W. Leche. (Nach der zweiten schwedischen Auflage.) Pp. viii+375. (Jena: Gustav Fischer, 1911.) Price 7.50 marks.

(1) BOTH these books are popular treatises discussing "man's place in nature" (to use the title of their English prototype), his origin, and development. They cover practically the same ground, and both aim at presenting the results of highly technical biological investigations in a form that will be intelligible to the educated layman. Nevertheless there is a marked contrast between them, one that in a measure reflects the influence of the difference in the attitude of the educated public towards the problems of evolution and the descent of man thirty-seven years ago and now. One of them is a weapon, forged in times of struggle, for the purpose of carrying offensive operations into the camp of those who were using every influence that casuistry and sentimentality could arouse to discredit Darwin and all his works. The other was written in more peaceful circumstances, long after such foolish animosities were buried, as one of the innumerable series of tributes which every country and class united in paying to Darwin's memory, on the occasion of the fiftieth anniversary of the publication of "The Origin of Species," two years ago.

This is the sixth edition of Haeckel's famous book. It first saw the light in 1874, in the days when the mere suggestion of the idea of evolution, in reference to man, was still regarded as "insulting" by many people. Its author was the most ardent and combative upholder of evolutionary ideas on the Continent, and he made no attempt to soothe the susceptibilities of his readers, preferring rather to set forth unpalatable views in the frankest and certainly not the least distasteful way. The book was originally flung as a challenge to the opponents of Darwinism, who replied by describing it as "a fleck of shame on the escutcheon of Germany."

Since then a vast change has taken place in the attitude of educated men towards the problem of evolution; but Haeckel has made surprisingly few changes in his book. From time to time, in the various successive editions, he has added liberally to the supply of illustrations, and tacked on a variety of tit-bits of new information, such as references to Pithecanthropus, the recent work on "the demonstration of the blood-relationship" of apes and man, and the results of investigations on the fate of the tail in man; but these are mere scraps of corroborative detail—embellishments to the edifice built in 1874, without altering the plan of the building or enlarging its dimensions. The great modern movements of biological thought in reference to heredity and evolution, and the results of recent morphological research, have made little or no impression upon Haeckel's book; its scope has not been enlarged to include the new learning; in spite of its veneer of modernity it is still a typical product of thirty years ago. But it is a wonderful tribute to its excellence that a book which does not claim to represent the present state of knowledge should maintain its position in competition with more recent works; it has, in fact, now attained the venerable rank of a classic.

The present edition is little more than a reprint of the fifth edition, which has appeared in an English translation. Slight additions have been made to the accounts of Amphioxus and the embryology of the chick, and a few more illustrations have been inserted; but these are mostly taken from old sources.

The author does not even provide a new preface; but in his introduction to the previous edition (1903) he frankly admitted that the literature relating to the problems discussed in his treatise had become so

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extensive and intensive that he made no pretence of keeping pace with it.

(2) Prof. Leche's book made its first appearance in Swedish at the time of the Darwin celebrations in 1909, and when the time came for the preparation of a second edition he made his interesting work available to a wider circle of readers by issuing this German edition.

The book is a simple and lucid description of the growth of evolutionary ideas, with an account of the men to whom we are indebted for this new learning. Unlike Haeckel's treatise, which takes the form of lectures addressed to students of biology, but in virtue of its lucidity has become, nevertheless, a popular treatise, Leche's book is obviously written for the educated public in general, and therefore omits certain topics discussed by Haeckel, which are properly included in a treatise on biology, but not in works for wider circulation.

It is somewhat disappointing to the biologist familiar with the author's important contributions to comparative anatomy that Prof. Leche should have chosen to cast his book in so popular a mould. It would have been instructive to have had more information concerning the higher primates from one who is so great an authority on the other end of the mammalian phylum. But Prof. Leche has chosen the *rôle* of expositor, mainly of other people's work, and we are duly grateful for his clear statement of generally accepted views regarding man's origin and developmental history.

The book opens with an exposition of the growth of the theory of evolution, with an account of the work of Charles Darwin, his predecessors, co-workers, and followers, and it discusses the modern conflict between the teaching of Weismann and "Neo-Lamarkismus," expressing the opinion, for which he claims the support of Darwin himself, that the origin of species can be explained only by admitting the potency of the essential factors emphasised by both schools.

The second chapter is a simple exposition of man's place in the vertebrate series, explained by reference to the facts of comparative anatomy and embryology. Chapter iii. gives an account of the nature of the palæontological record, and deals at some length with the histories of the various vertebrate groups that have been recovered by this means, most of the space devoted to mammals being filled by the familiar story of the horse. The next three chapters deal respectively with man's structure as illuminated by comparison with that of other vertebrates; the light thrown on man's development by comparative embryology; and the nature and significance of rudimentary organs in the human body, the pineal body, the third eyelid, the palatal ridges, the coccyx, superfluous hair and teeth, and the vermiform appendix being the vestigial structures selected for discussion. There is a brief chapter on the brain, which can scarcely be considered adequate when it is remembered that it is the organ which has played the chief part in making man what he is.

The closing chapters are perhaps most useful to the zoological reader. They deal with man's nearest relatives, the primates, fossil-man and Pithecanthropus.

It is gratifying to find that Prof. Leche lends the weight of his support to the view, first set forth in NATURE in the year 1907, that Tarsius is the slightly specialised living representative of a very primitive group of primates, from which the lemurs and the apes were derived by specialisation along divergent lines; that in this sense Tarsius is the connecting link between these two suborders, because it is the least modified descendant of the common parents of all three suborders of primates.

There is a very useful summary of the circumstances of the discovery of the remains of Palæolithic man and Pithecanthropus, with an unbiassed account of the nature and significance of these much-discussed relics of fossil-man. In the chapters dealing with this subject he follows Schwalbe in most matters, and describes the recent trend of opinion on the Continent in reference to Palæolithic man, without committing himself, however, to any of the extreme views that are so much in evidence at the present time.

The volume closes with a brief statement in reference to certain points in the anatomy of modern man that have some wider significance of racial or sociological importance.

Prof. Leche's book can be heartily recommended as a calm and dispassionate summary of the present state of our knowledge of the structure of man, as it is interpreted by comparative anatomy. G. E. S.

GEOLOGY AND BUILDING STONES.

(1) *The Geology of Building Stones.* By J. Allen Howe. Pp. viii+455. (London: E. Arnold, 1910.) Price 7*s*. 6*d*. net.

(2) *British and Foreign Building Stones: a Descriptive Catalogue of the Specimens in the Sedgwick Museum, Cambridge.* By John Watson. Pp. viii+484. (Cambridge: University Press, 1911.) Price 3*s*. net.

(1) THERE has long been a demand for a book such as that now produced by Mr. Howe. It would be well for all architects, and also engineers, to go through some short course of geological training, leading up to the understanding of a geological map. Mr. Howe has to meet those cases where no preliminary work has been possible, and he describes in a clear manner the essential characters of rock-forming minerals. Quaintly, but properly enough, he includes ice, the mineral most utilised by the Eskimo. Knowing as he does the utility of the microscope, he introduces extinction angles in the table of the felspars on p. 20, but these are left unexplained, and the variation in the angle between the cleavages would surely be more interesting to the beginner. Thin sections of typical rocks are well illustrated in the later pages. The work of Dr. Flett, Mr. Lovegrove, and the author, has probably introduced the microscope to many "practical" men with good effect.

The classification of rocks employed is commendably simple. Trachyte seems to have slipped out of the table on p. 43, as a parallel with rhyolite and andesite, though it is described on p. 103. Mr. Howe

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